

Vertical Velocity Focus Group

“Large Scale” Precipitation

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With contributions from Ed Luke, Pavlos Kollias, Scott Collis, Edwin Campos, Mike Jensen and Richard Coulter;

Large Scale Precipitation

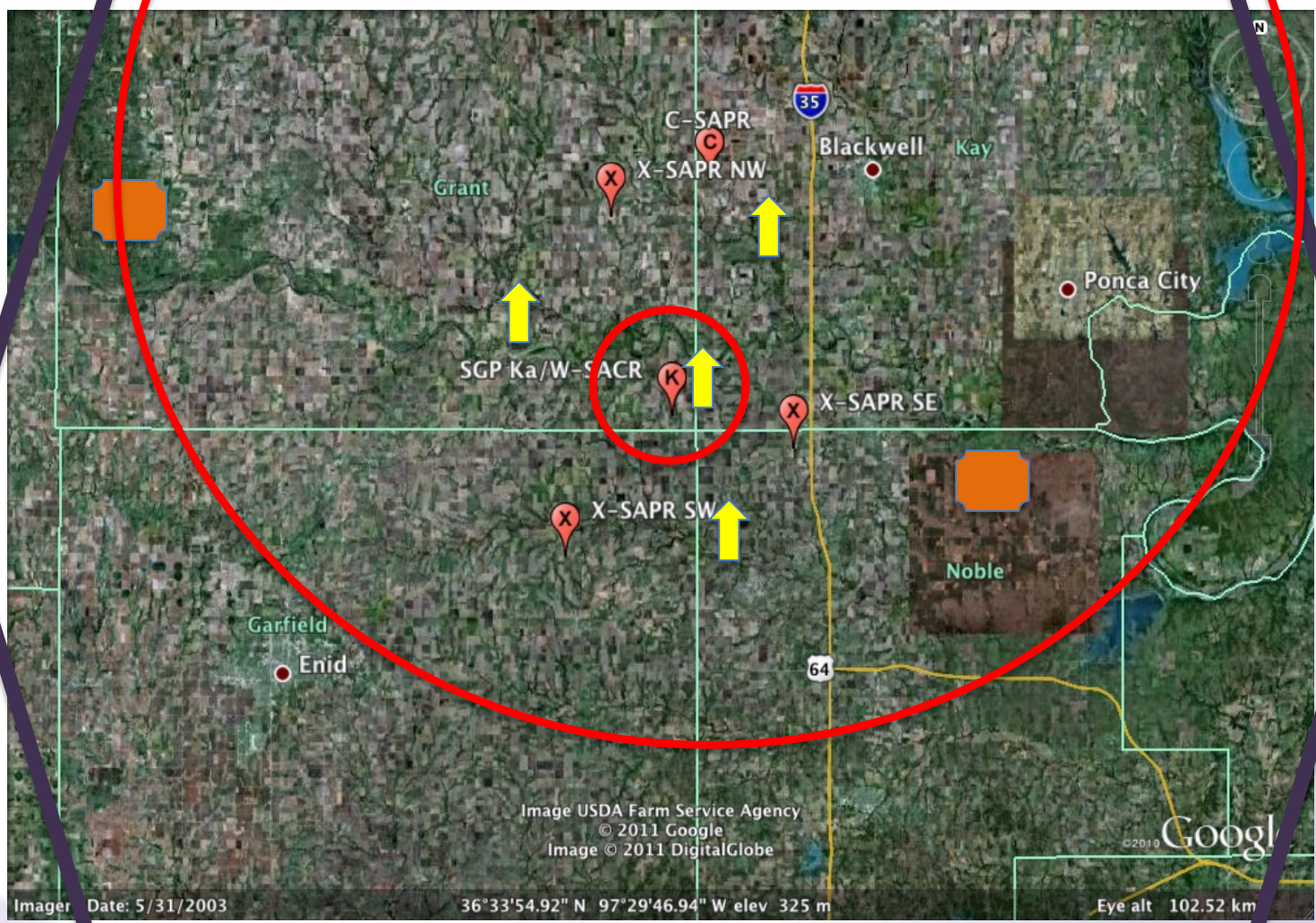
Connection with ASR Science Process Themes

- VV, Rainfall / DSD Properties, Media Phase, Complete deep convective cloud lifecycle

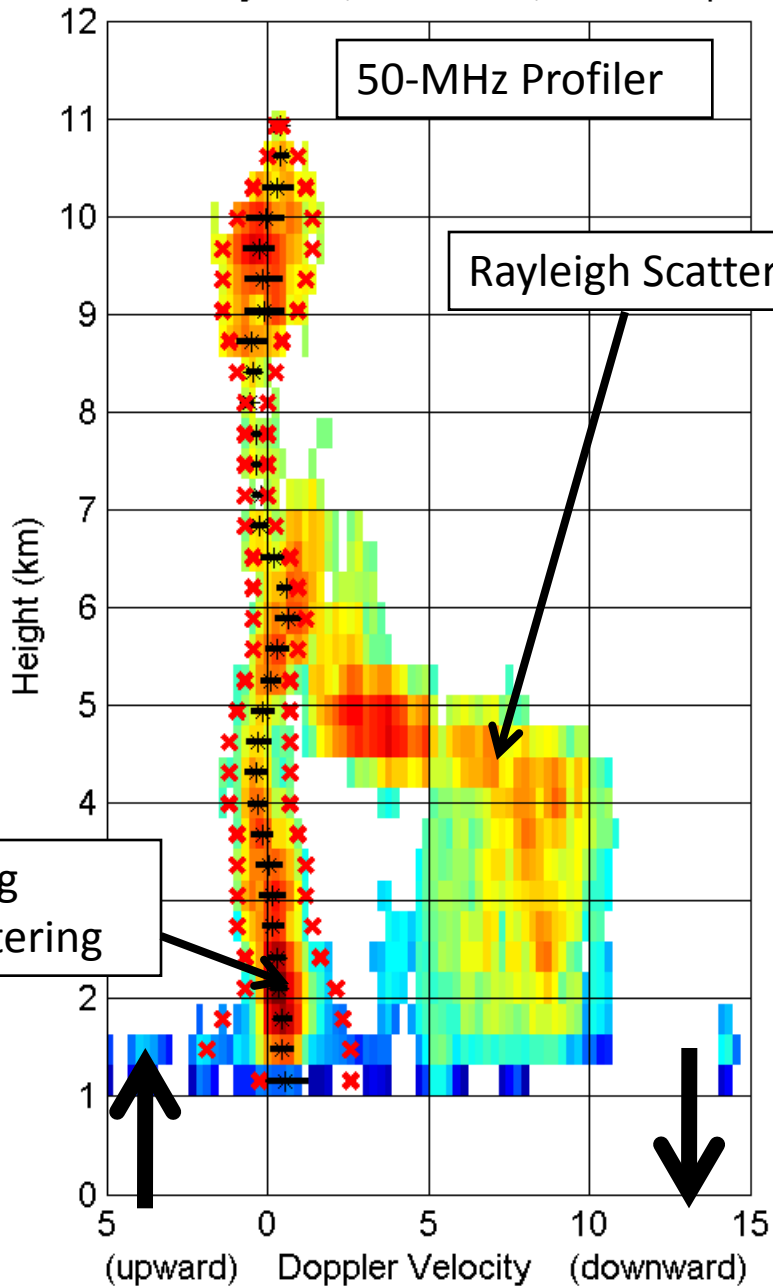
Observations to Modelers (Science Applications)

- Convective – Stratiform Segregations
- Updraft – Hydrometeor Storm interaction
- Performance, microphysical/dynamic evaluation

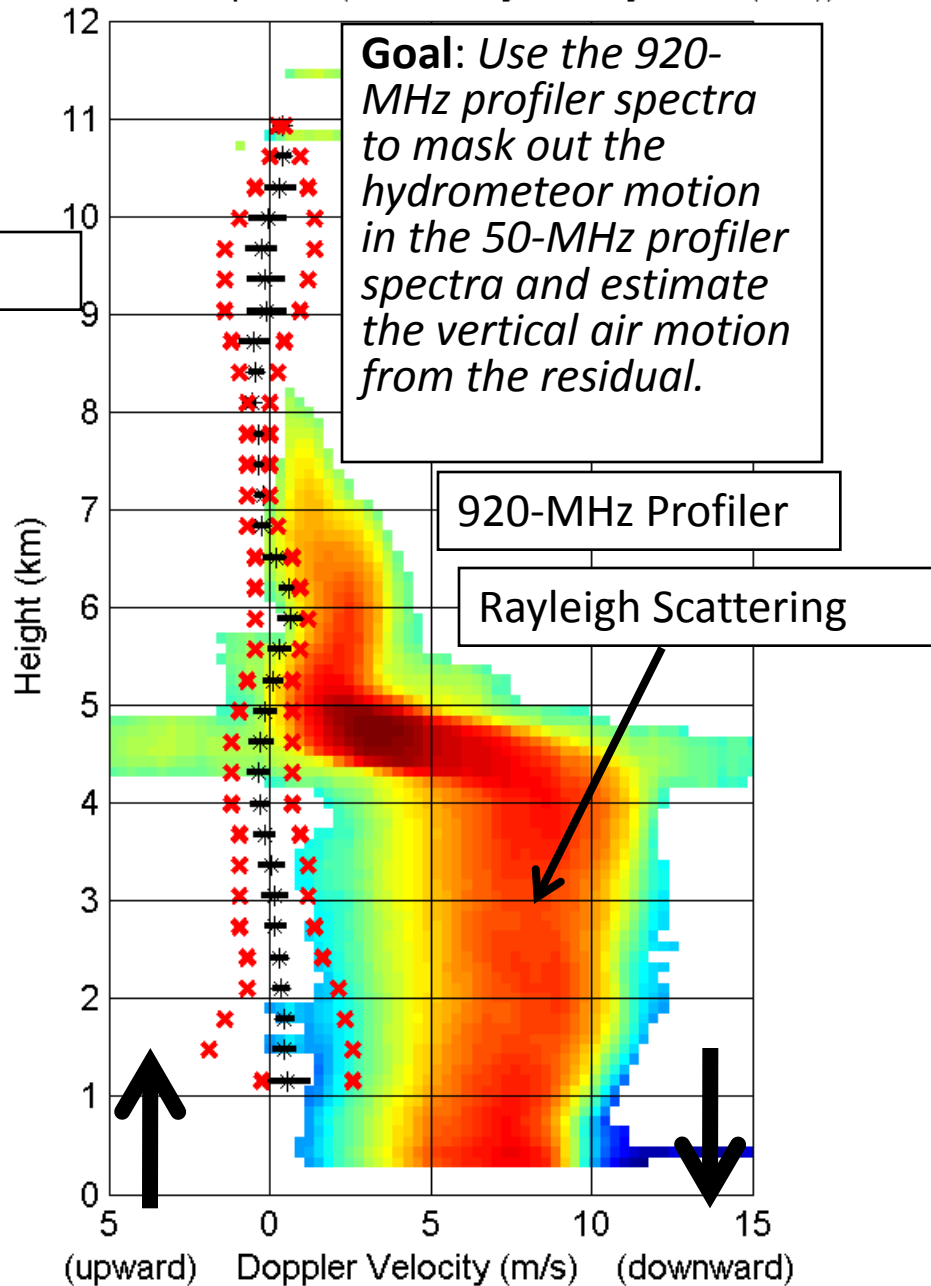
Keeping in Mind "Facility" Integration



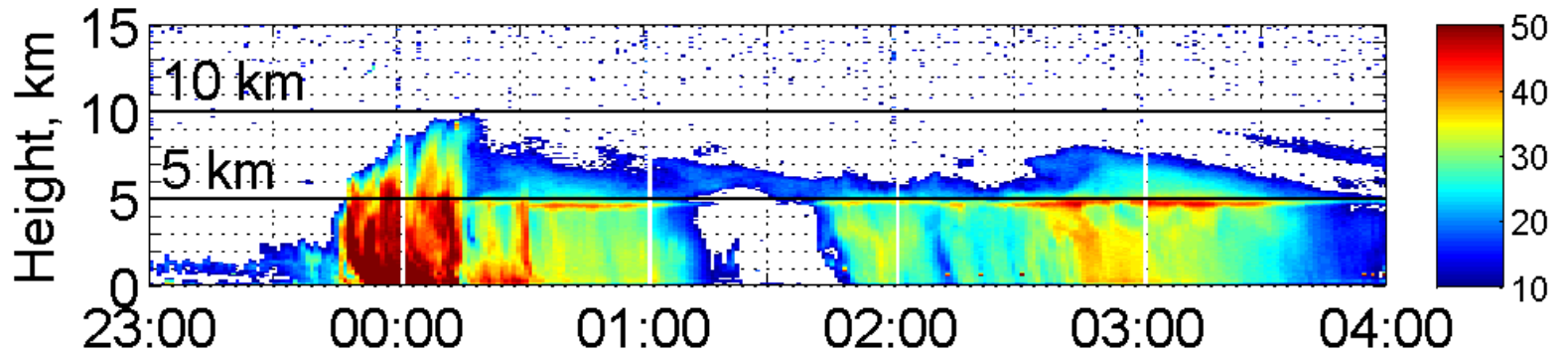
a. 20 January 2006, 03:05 UTC, 50 MHz Spectra



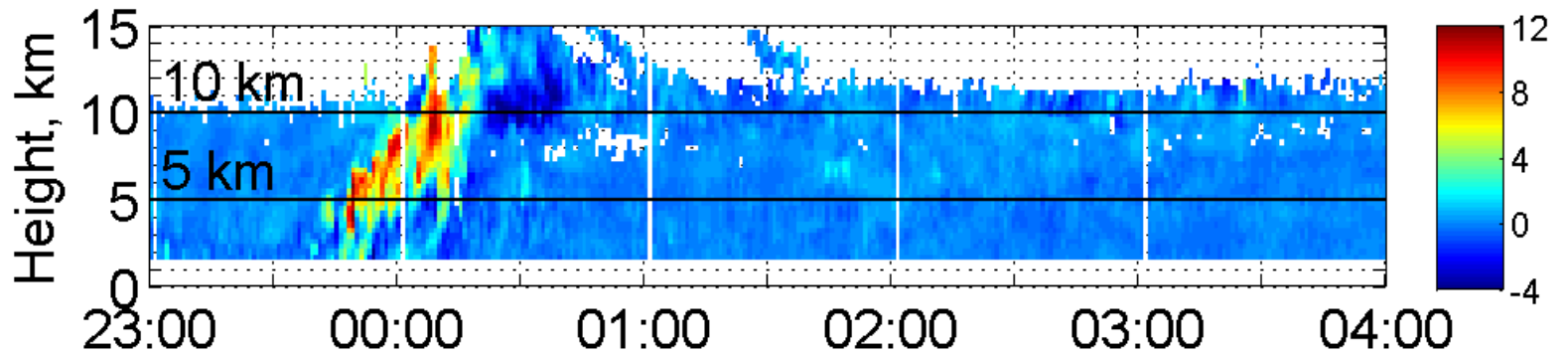
b. 920 MHz Spectra (Reflectivity Density - dBZ/(m/s))



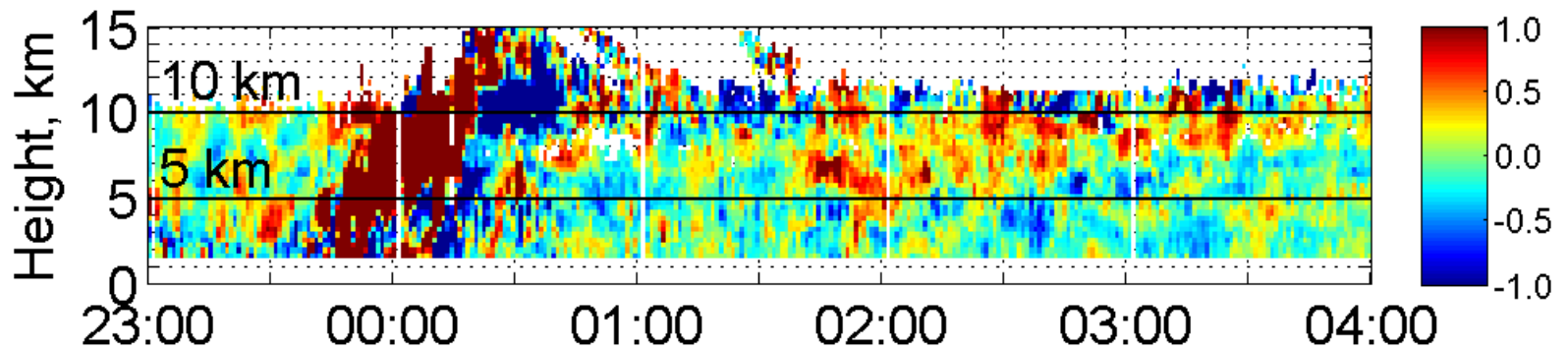
920-MHz Reflectivity, (dBZ), 19-20 January 2006



Vertical Air Motion, Positive Upward, (m/s)



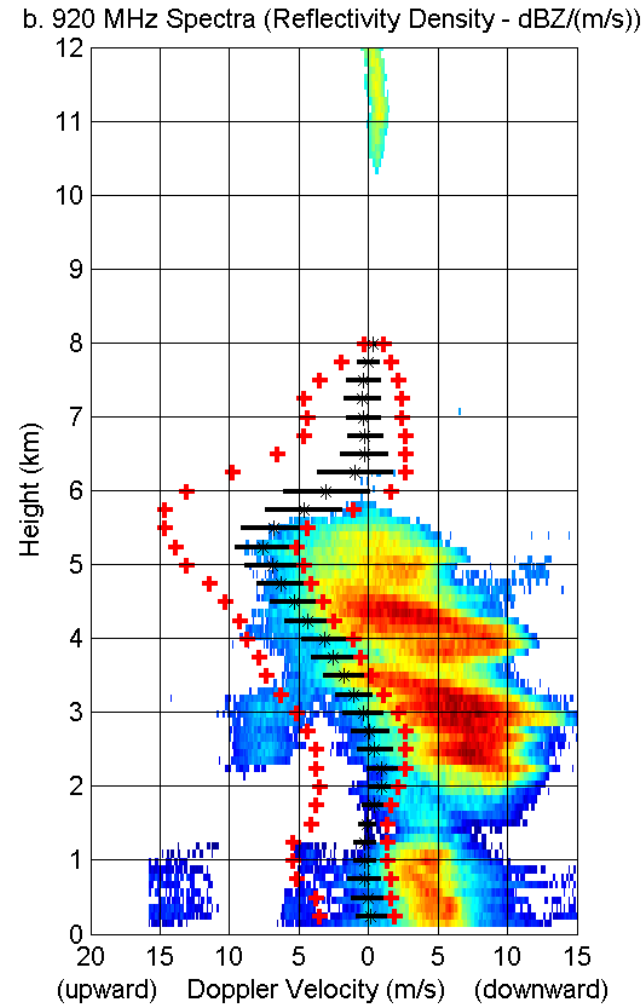
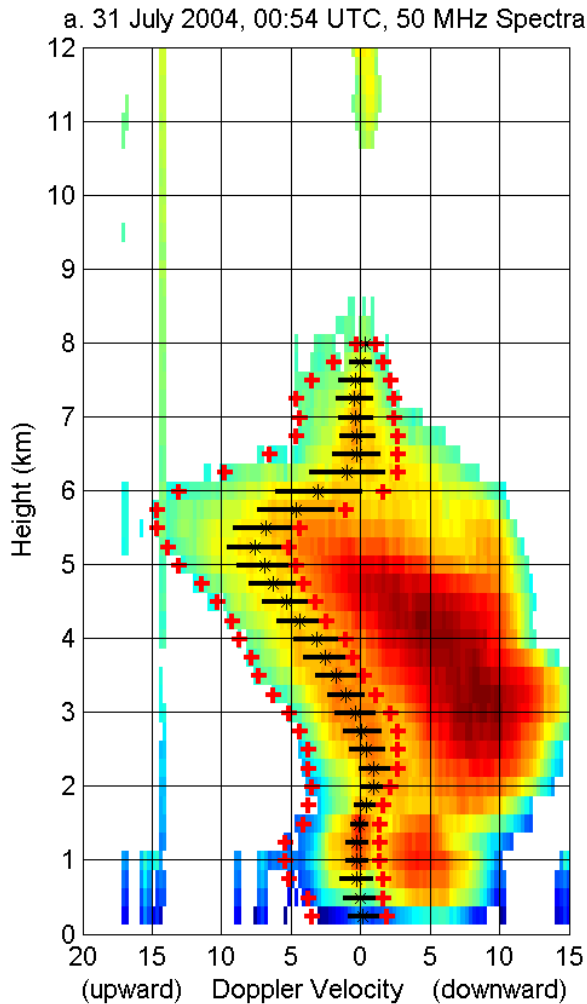
Vertical Air Motion, Positive Upward, (m/s)



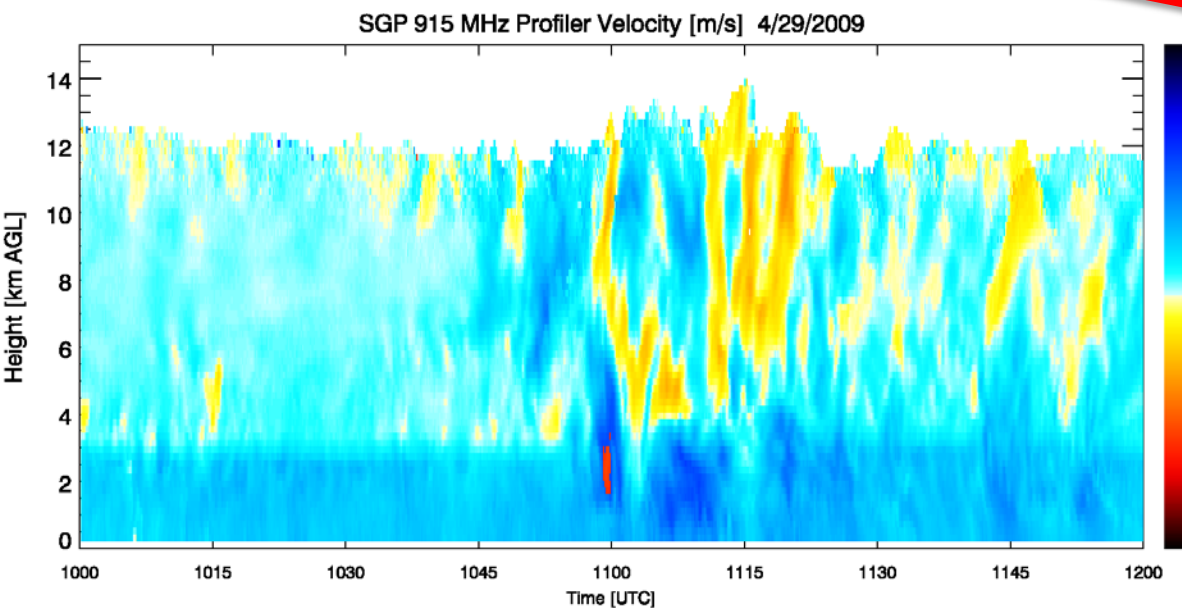
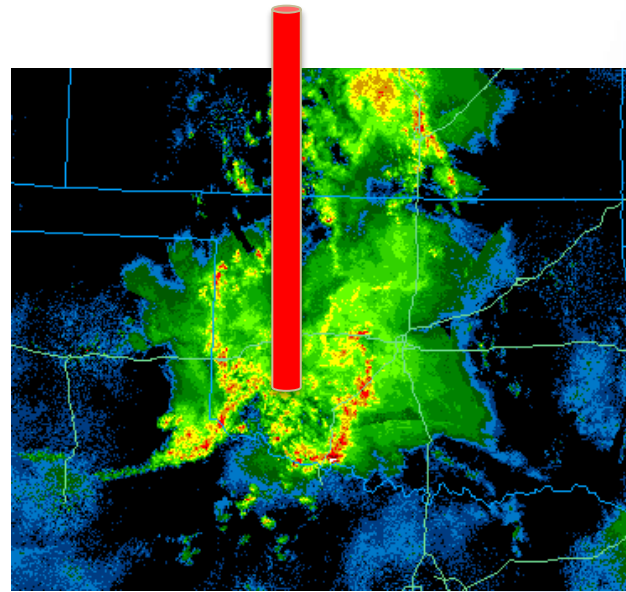
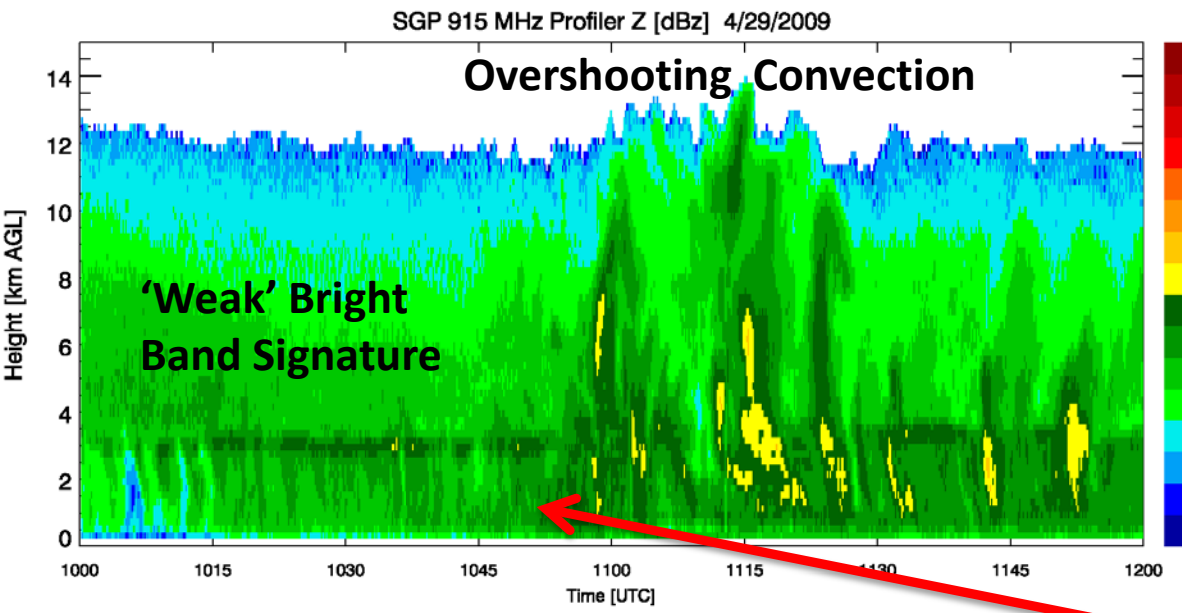
Hour of Day, UTC

Application in MC³E

This dual-frequency vertical air motion technique can be applied to 449-MHz and 2.8-GHz profiler spectra.



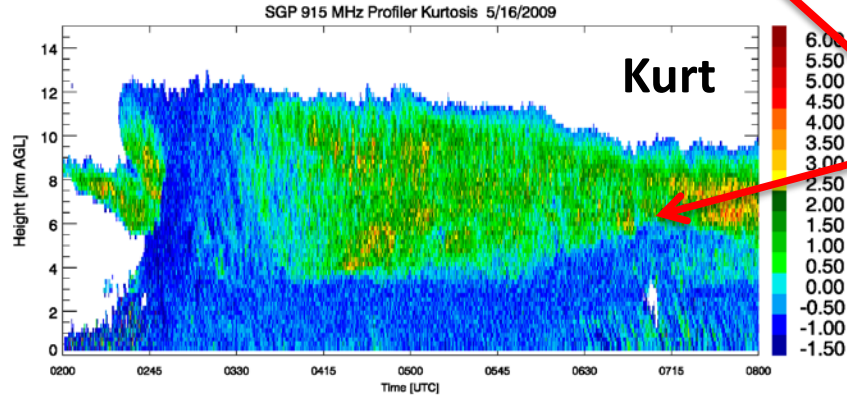
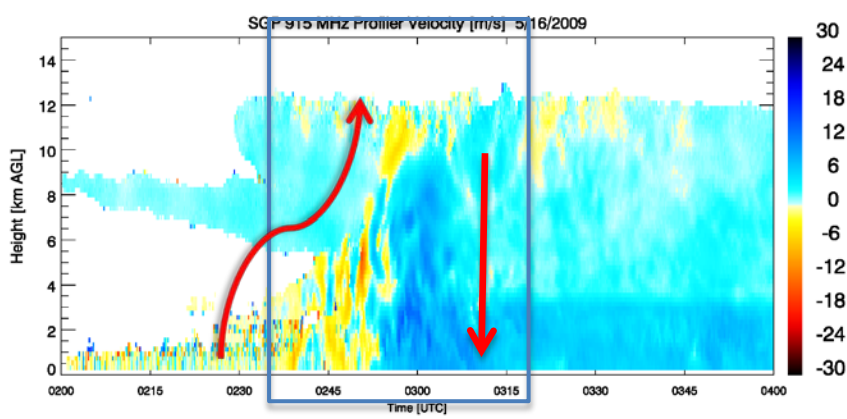
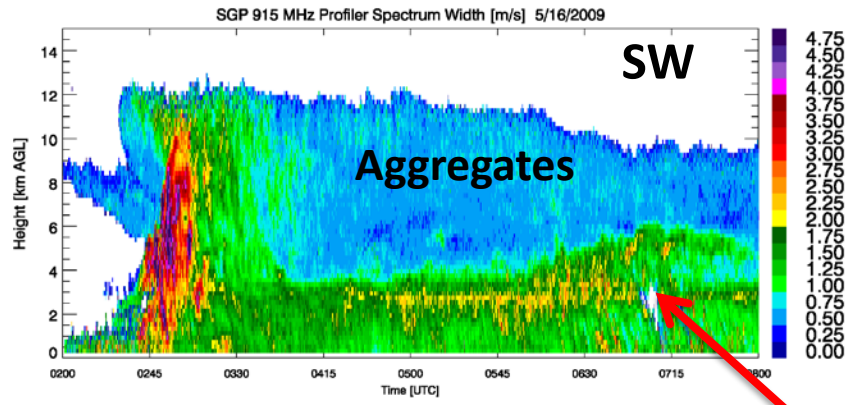
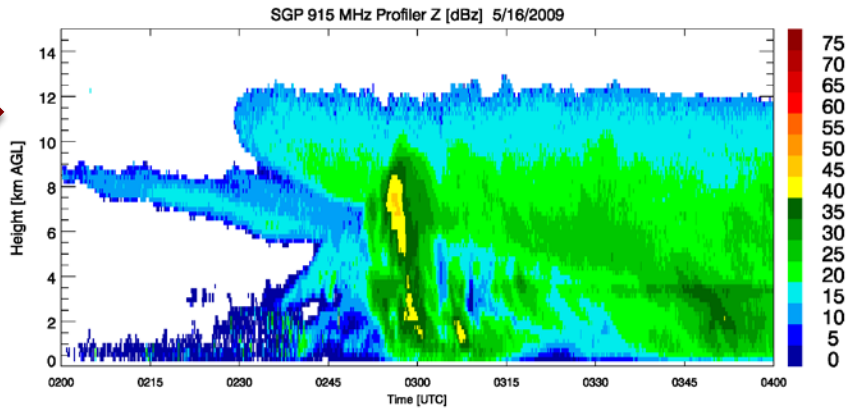
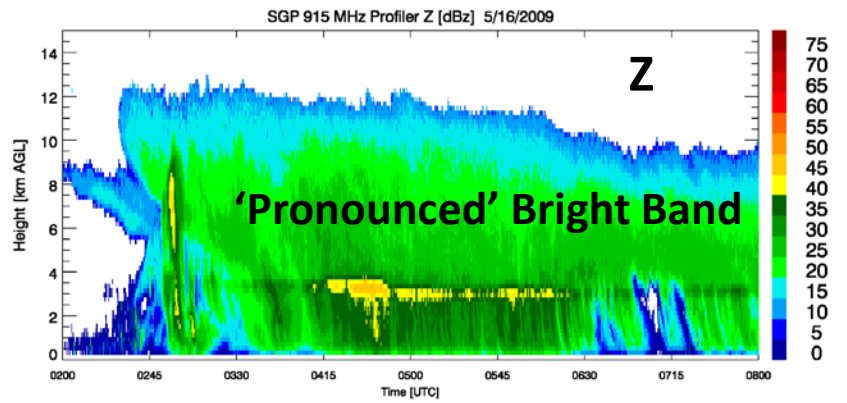
ARM 915-MHz Methods: MC3E & Beyond



'Large Scale' often interspersed, fed by evolving convective systems.

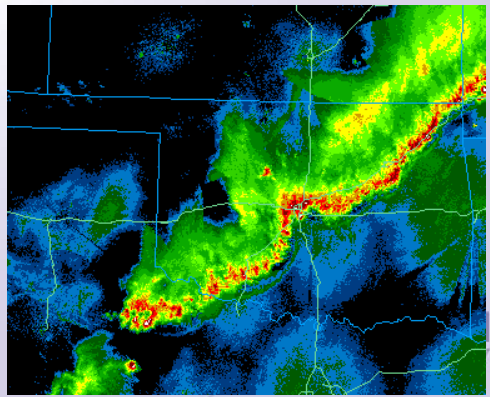
'Challenge' is always in working together on 'convective', 'stratiform', 'transition' regimes.

ARM 915-MHz Insights

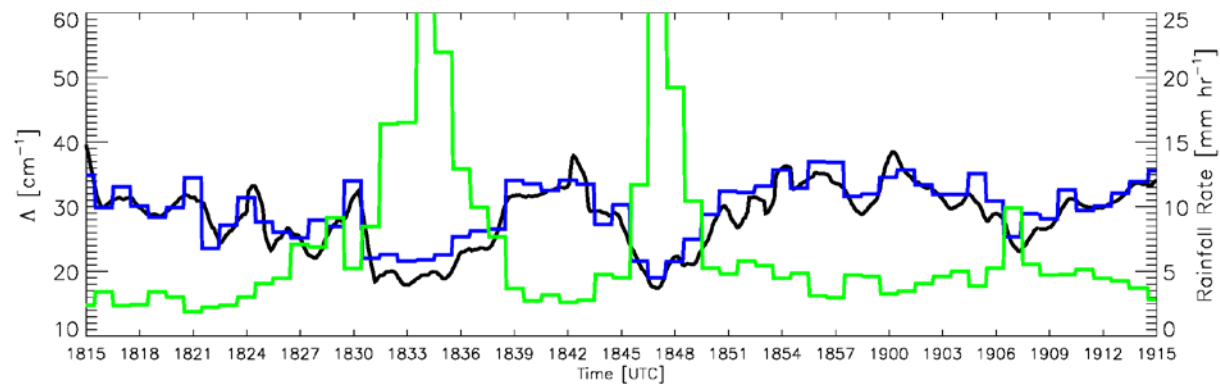
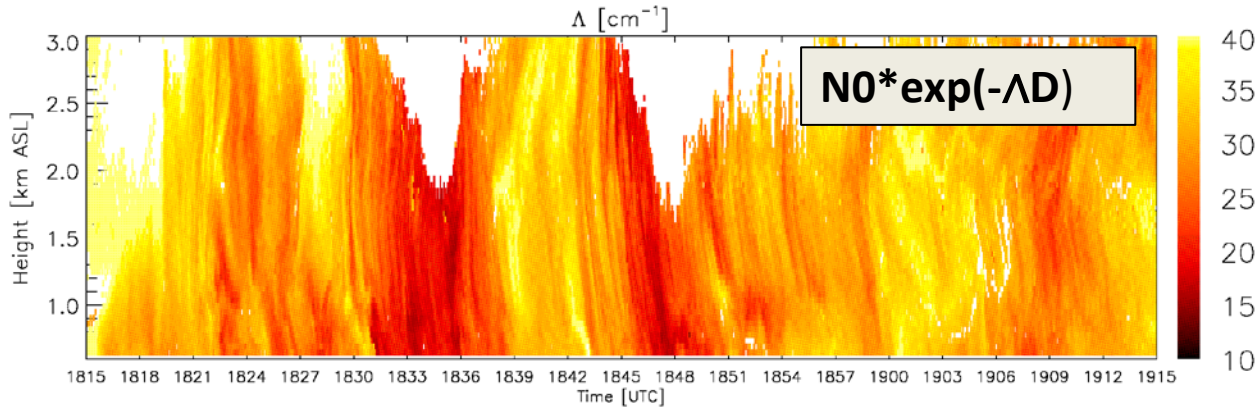
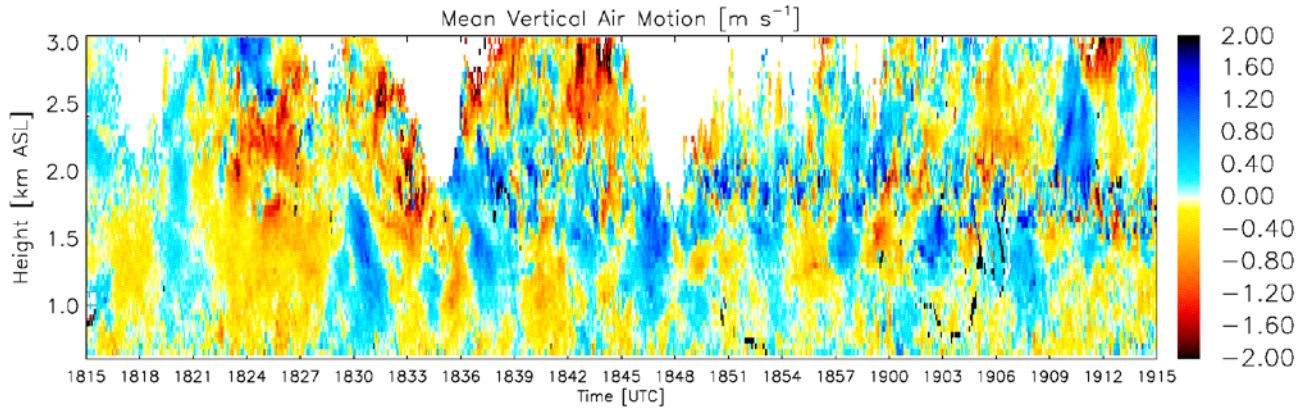


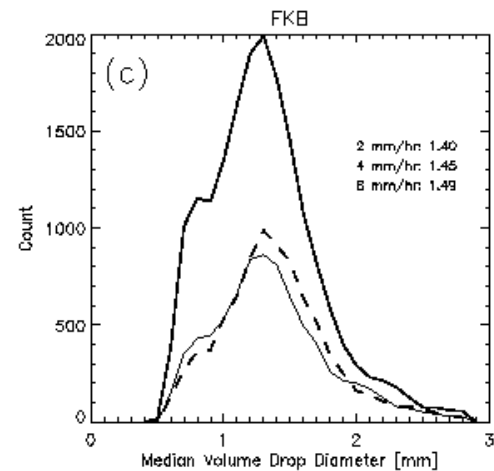
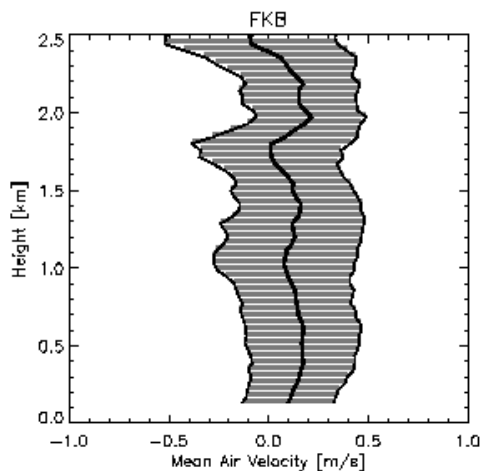
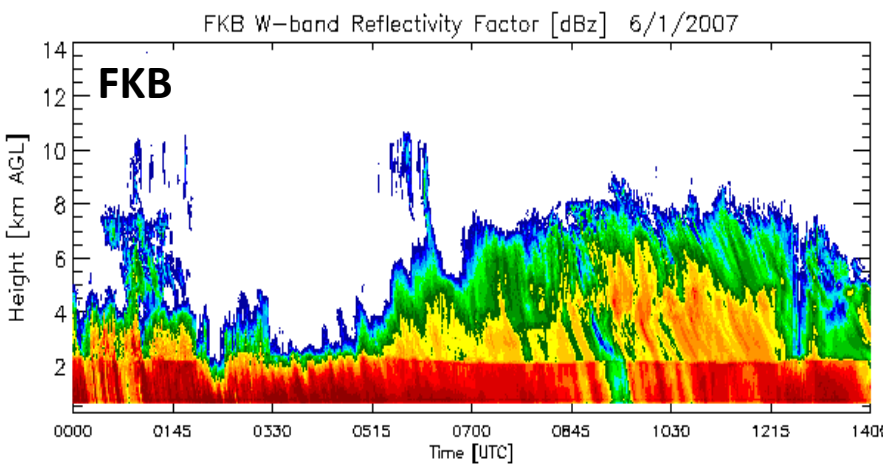
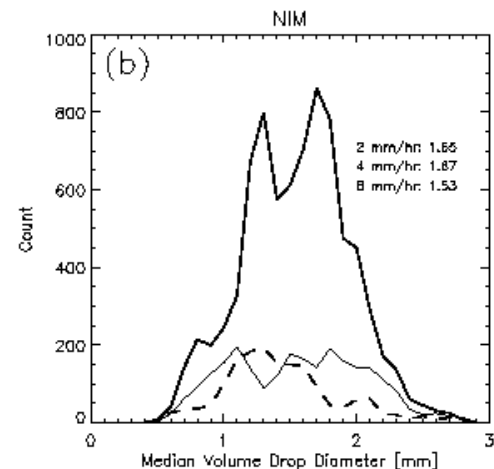
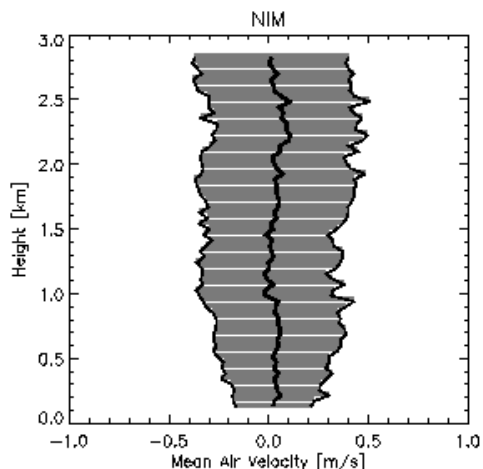
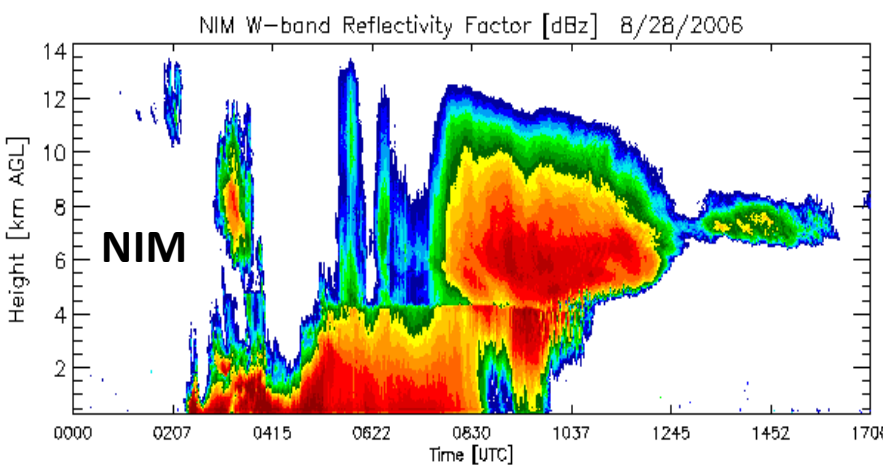
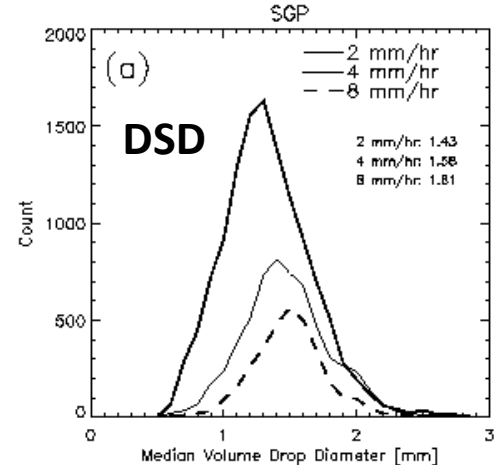
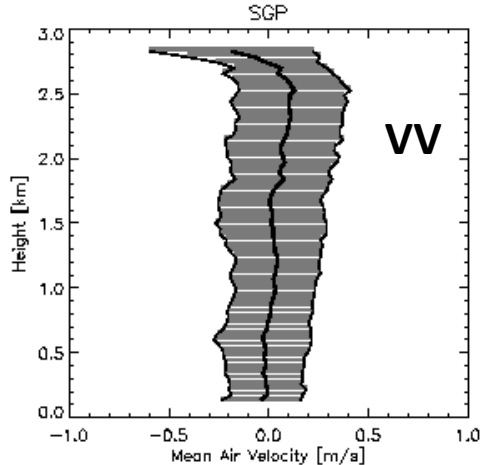
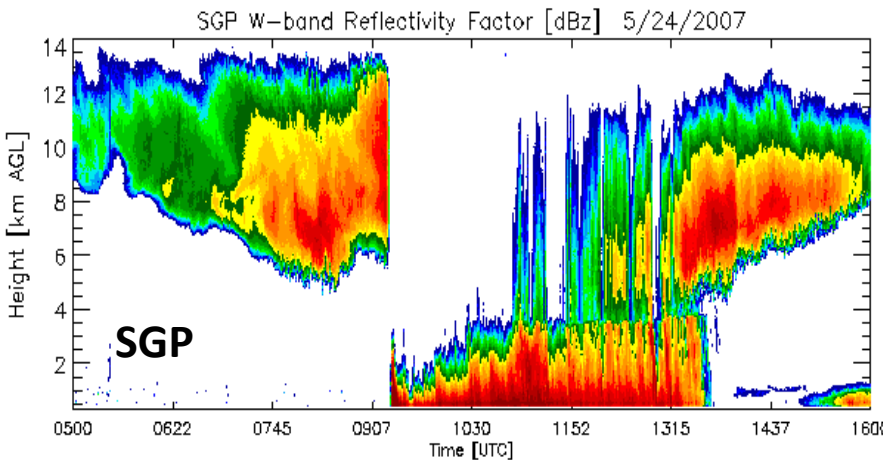
Rear inflow?

HCA – See Poster

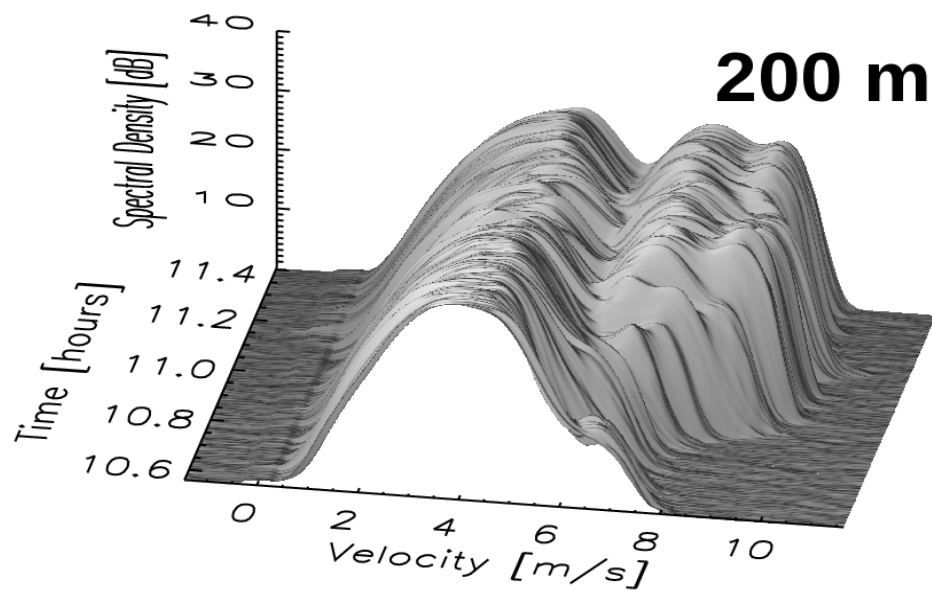
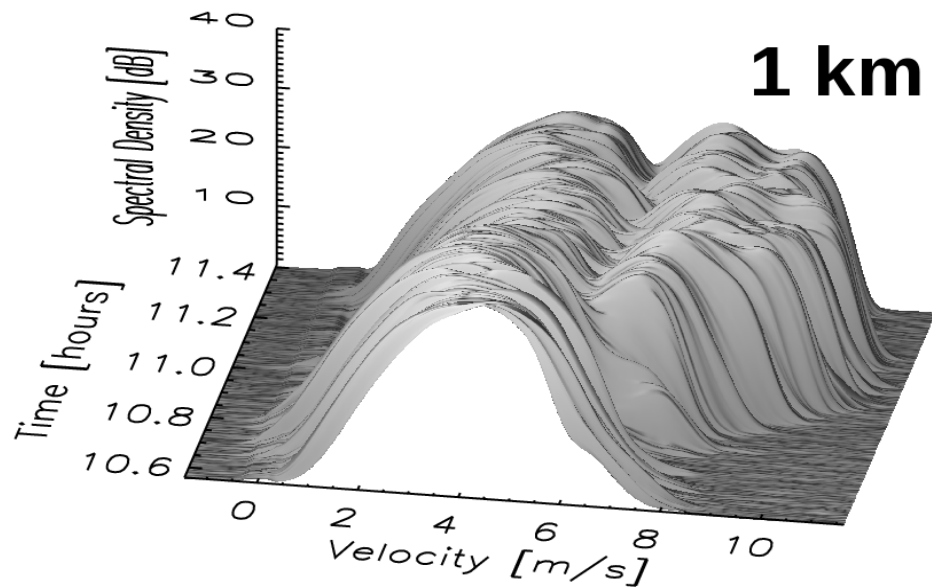
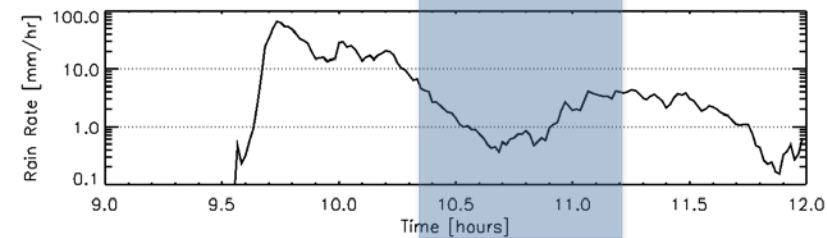
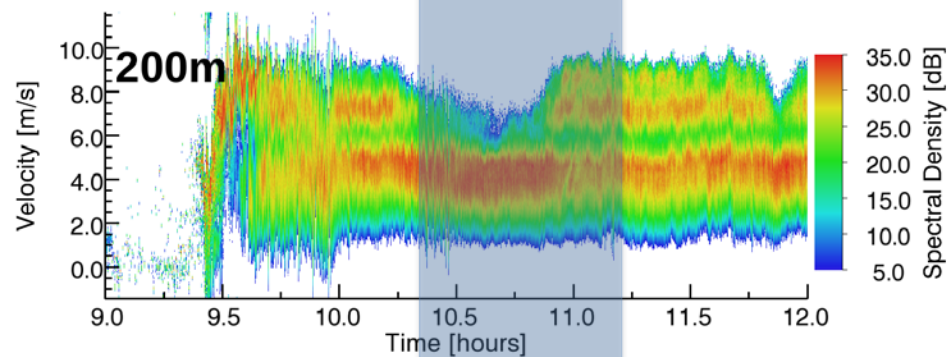
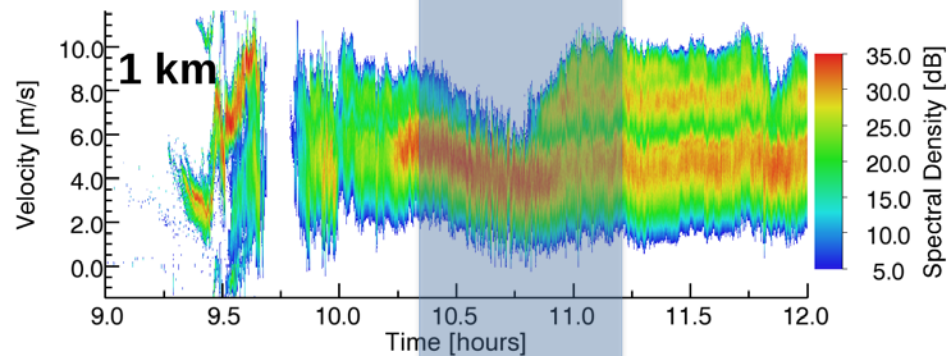
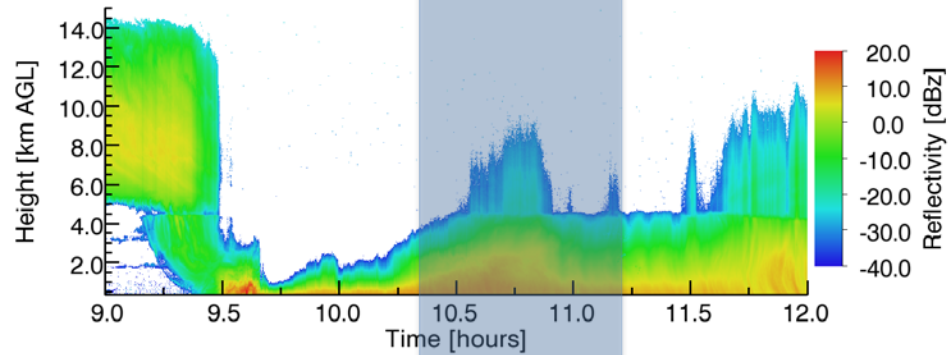


94-GHz Methods for VV / DSD Retrievals





Convective to Stratiform Niamey WACR Example



RETRIEVAL	DUAL PROFILER	915-SOLO	94-GHz
Vertical Velocity	Mature: ~ 1 minute update	Improving: MC3E ~ 6 sec update, 100 m	Mature: ~ 2 sec update, 45 m
DSD / SFC or Height	Moderate, MC3E shakedown with cross comparisons	Low / MC3E exploratory efforts	Moderate / MC3E shakedown with cross comparisons
HCA / Stratiform / Convective Masking	Moderate / MC3E radar and aircraft cross comparisons	Moderate / MC3E radar and aircraft cross comparisons	Low – Attenuation through heavier rainfall
“VAP” – Ready?	VV (MC3E-only); DSD (MC3E – Highly possible, following available cross comparisons)	VV (MC3E: Low – new exploratory modes) HCA (Moderate, Cross Comp with Radar, Aircraft)	VV (High, Time) DSD (High, following final cross comparison with new MC3E/SGP facilities)

Future Work

